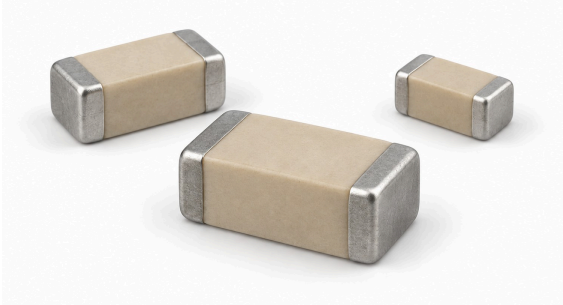


Multilayer Chip Ceramic Capacitors

Full specification (English)



TABULATED DIELECTRICS
C0G · X5R · X6S · X7R · X7S · X7T ①

TABULATED CASE SIZES
0105 – 2220 ②

TABULATED RATED VOLTAGE
2.5 – 2000 V

TABULATED CAPACITANCE
0.1 pF – 220 μF

1. Capacitor and dielectric types ⑧

C0G: capacitors with this dielectric are Class I capacitors, including general-purpose and high-frequency C0G capacitors. Their electrical properties are the most stable and change very little with temperature, voltage and time. They are suited to applications that require low losses and high stability, such as filters, oscillators and timing circuits.

X7R, X5R, X6S, X7T, X7S: these dielectrics have a high dielectric constant; capacitors made with them are Class II capacitors, with higher capacitance than Class I. They have a semi-stable temperature characteristic and are used over a wide temperature range, in circuits such as DC blocking, decoupling, bypassing and frequency discrimination.

2. Product structure

No.	Name
1	Ceramic dielectric
2	Inner electrode
3	Outer electrode
4	Nickel layer
5	Tin layer

Chip capacitor, cut-away view (L length, W width, T thickness)

3. Part numbering ⑫

0805
1 · Size
0805

CG
2 · Dielectric
C0G

3
3 · Digits ①
100 = 3 digits

101
4 · Capacitance
100 pF

J
5 · Tolerance
±5%

500
6 · Rated voltage
50 V

N
7 · Termination
Nickel barrier

T
8 · Packaging
Taping

Ordering example as given on the original sheet; positions 1 to 8 are explained in the tables below.

1 · Size code ②

Size code	0105	0201	0402	0603	0805	1206	1210	1808	1812	2220	2225	3035
L × W (inch)	—	—	0.04×0.02	0.06×0.03	0.08×0.05	0.12×0.06	0.12×0.10	0.18×0.08	0.18×0.12	0.22×0.20	0.22×0.25	0.3×0.35
L × W (mm)	0.40×0.20	0.60×0.30	1.00×0.50	1.60×0.80	2.00×1.25	3.20×1.60	3.20×2.50	4.50×2.00	4.50×3.20	5.70×5.00	5.70×6.30	7.60×9.00

0105 = 01005 (inch) = 0402 (metric); 0201 = 0603 (metric). Inch L × W of 0105 and 0201 not given in the source.

2 · Dielectric ①

Code	CG	D	B	E	G	S	F
Dielectric	C0G	X5R	X7R	X7T	X7S	X6S	Y5V

3 · Number of digits ①

Total number of characters of the capacitance value in pF, e.g. 102 = 1000 = 4

4 · Nominal capacitance (pF)

Code	Value (pF)
0R5	0.5
1R0	1.0
102	10×10^2
224	22×10^4
...	...

The first two digits are significant figures; the third digit is the number of zeros; R = decimal point.

6 · Rated voltage (V)

Code	Value (V)
6R3	6.3
500	50×10^0
201	20×10^1
102	10×10^2
...	...

The first two digits are significant figures; the third digit is the number of zeros; R = decimal point.

5 · Capacitance tolerance

Code	B	C	D	F	G	J	K	M	Z
Tolerance	±0.1 pF	±0.25 pF	±0.5 pF	±1.0%	±2.0%	±5%	±10%	±20%	+80% -20%

Tolerances B, C and D apply only to capacitance values of 10 pF or less.

7 · Termination

Termination	Code
Silver termination (solderable)	S
Copper termination (solderable)	C
Nickel barrier termination (three-layer plated)	N

8 · Packaging

Code	B	T
Packaging	Bulk (bag)	Taping

Temperature characteristics ③

Dielectric	Reference temperature	Temperature coefficient / characteristic	Operating temperature range
C0G	20 °C	0 ±30 ppm/°C	-55 °C ~ +125 °C
X5R	20 °C	±15%	-55 °C ~ +85 °C
X7R	20 °C	±15%	-55 °C ~ +125 °C
X7T	20 °C	+22/-33%	-55 °C ~ +125 °C
X7S	20 °C	±22%	-55 °C ~ +125 °C
Y5V	20 °C	-80% +30%	-25 °C ~ +85 °C
X6S	20 °C	±22%	-55 °C ~ +105 °C

Class I: the nominal temperature coefficient and its tolerance are determined from the capacitance change between 20 °C and 85 °C. Class II: the nominal temperature characteristic is determined from the capacitance change over the operating temperature range relative to the capacitance at 20 °C.

4. Product capacitance range

0105 (0402) — inch 01005

Dielectric		C0G							X7R						X5R					
Code	Cap. / V _{DC}	50	35	25	16	10	6.3		50	35	25	16	10	6.3	50	35	25	16	10	6.3
0R1	0.1 pF	Y	Y	Y	Y	Y	Y													
0R2	0.2 pF	Y	Y	Y	Y	Y	Y													
0R3	0.3 pF	Y	Y	Y	Y	Y	Y													
0R4	0.4 pF	Y	Y	Y	Y	Y	Y													
0R5	0.5 pF	Y	Y	Y	Y	Y	Y													
0R6	0.6 pF	Y	Y	Y	Y	Y	Y													
0R7	0.7 pF	Y	Y	Y	Y	Y	Y													
0R8	0.8 pF	Y	Y	Y	Y	Y	Y													
0R9	0.9 pF	Y	Y	Y	Y	Y	Y													
1R0	1.0 pF	Y	Y	Y	Y	Y	Y													
1R1	1.1 pF	Y	Y	Y	Y	Y	Y													
1R2	1.2 pF	Y	Y	Y	Y	Y	Y													
1R3	1.3 pF	Y	Y	Y	Y	Y	Y													
1R5	1.5 pF	Y	Y	Y	Y	Y	Y													
1R6	1.6 pF	Y	Y	Y	Y	Y	Y													
1R8	1.8 pF	Y	Y	Y	Y	Y	Y													
2R0	2.0 pF	Y	Y	Y	Y	Y	Y													
2R2	2.2 pF	Y	Y	Y	Y	Y	Y													
2R4	2.4 pF	Y	Y	Y	Y	Y	Y													
2R7	2.7 pF	Y	Y	Y	Y	Y	Y													
3R0	3.0 pF	Y	Y	Y	Y	Y	Y													
3R3	3.3 pF	Y	Y	Y	Y	Y	Y													
3R6	3.6 pF	Y	Y	Y	Y	Y	Y													
3R9	3.9 pF	Y	Y	Y	Y	Y	Y													
4R0	4.0 pF	Y	Y	Y	Y	Y	Y													
4R3	4.3 pF	Y	Y	Y	Y	Y	Y													
4R7	4.7 pF	Y	Y	Y	Y	Y	Y													
5R0	5.0 pF	Y	Y	Y	Y	Y	Y													
5R1	5.1 pF	Y	Y	Y	Y	Y	Y													
5R6	5.6 pF	Y	Y	Y	Y	Y	Y													
6R0	6.0 pF	Y	Y	Y	Y	Y	Y													
6R2	6.2 pF	Y	Y	Y	Y	Y	Y													
6R8	6.8 pF	Y	Y	Y	Y	Y	Y													
7R0	7.0 pF	Y	Y	Y	Y	Y	Y													
7R5	7.5 pF	Y	Y	Y	Y	Y	Y													
8R0	8.0 pF	Y	Y	Y	Y	Y	Y													
8R2	8.2 pF	Y	Y	Y	Y	Y	Y													
9R0	9.0 pF	Y	Y	Y	Y	Y	Y													
9R1	9.1 pF	Y	Y	Y	Y	Y	Y													
100	10 pF	Y	Y	Y	Y	Y	Y													
120	12 pF	Y	Y	Y	Y	Y	Y													
160	16 pF	Y	Y	Y	Y	Y	Y													
180	18 pF	Y	Y	Y	Y	Y	Y													
220	22 pF	Y	Y	Y	Y	Y	Y													
330	33 pF	Y	Y	Y	Y	Y	Y													
390	39 pF	Y	Y	Y	Y	Y	Y													
470	47 pF	Y	Y	Y	Y	Y	Y													
560	56 pF	Y	Y	Y	Y	Y	Y													
680	68 pF							Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
101	100 pF							Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
181	180 pF							Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
221	220 pF							Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
241	240 pF							Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
271	270 pF							Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
331	330 pF							Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
471	470 pF							Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
681	680 pF							Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
751	750 pF							Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
102	1 nF							Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
152	1.5 nF																Y	Y	Y	Y
222	2.2 nF																Y	Y	Y	Y
332	3.3 nF																Y	Y	Y	Y
472	4.7 nF																Y	Y	Y	Y
682	6.8 nF																Y	Y	Y	Y
103	10 nF																Y	Y	Y	Y

Code = capacitance in pF (two significant digits + number of zeros; R = decimal point). Letters = thickness code T, see the Dimensions table; blank = not listed.
Values are for reference only; the actual capacitance range depends on the use requirement.

Dielectric		C0G							X7R							X7S							X7T								X6S								X5R							
Code	Cap. / V _{OC}	50	35	25	16	10	6.3	50	35	25	16	10	6.3	50	35	25	16	10	6.3	50	35	25	16	10	6.3	4	50	35	25	16	10	6.3	4	2.5	50	35	25	16	10	6.3	4					
0R1	0.1 pF	Z	Z	Z	Z	Z	Z																																							
0R2	0.2 pF	Z	Z	Z	Z	Z	Z																																							
0R3	0.3 pF	Z	Z	Z	Z	Z	Z																																							
0R4	0.4 pF	Z	Z	Z	Z	Z	Z																																							
0R5	0.5 pF	Z	Z	Z	Z	Z	Z																																							
0R6	0.6 pF	Z	Z	Z	Z	Z	Z																																							
0R7	0.7 pF	Z	Z	Z	Z	Z	Z																																							
R75	.75 pF	Z	Z	Z	Z	Z	Z																																							
0R8	0.8 pF	Z	Z	Z	Z	Z	Z																																							
0R9	0.9 pF	Z	Z	Z	Z	Z	Z																																							
1R0	1.0 pF	Z	Z	Z	Z	Z	Z																																							
1R1	1.1 pF	Z	Z	Z	Z	Z	Z																																							
1R2	1.2 pF	Z	Z	Z	Z	Z	Z																																							
1R3	1.3 pF	Z	Z	Z	Z	Z	Z																																							
1R4	1.4 pF	Z	Z	Z	Z	Z	Z																																							
1R5	1.5 pF	Z	Z	Z	Z	Z	Z																																							
1R6	1.6 pF	Z	Z	Z	Z	Z	Z																																							
1R8	1.8 pF	Z	Z	Z	Z	Z	Z																																							
2R0	2.0 pF	Z	Z	Z	Z																																									

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0402 (1005)

[illegible]

Dielectric		C0G							X7R							X7S							X7T							X6S							X5R												
Code	Cap. / V _{DC}	100	50	35	25	16	10	6.3	100	50	35	25	16	10	6.3	100	50	35	25	16	10	6.3	100	50	35	25	16	10	6.3	4	100	50	35	25	16	10	6.3	4	100	50	35	25	16	10	6.3				
562	5.6 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
682	6.8 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
822	8.2 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
103	10 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
123	12 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
153	15 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
183	18 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
203	20 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
223	22 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
273	27 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
333	33 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
393	39 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
473	47 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
563	56 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
683	68 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
823	82 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
104	100 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
124	120 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
154	150 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
184	180 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
204	200 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
224	220 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
274	270 nF								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
334	330 nF								A*	A*	A*	A*	A*	A*	A*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
394	390 nF								A*	A*	A*	A*	A*	A*	A*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
474	470 nF								A*	A*	A*	A*	A*	A*	A*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
684	680 nF								A*	A*	A*	A*	A*	A*	A*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
824	820 nF								A*	A*	A*	A*	A*	A*	A*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
105	1 μF								A*	A*	A*	A*	A*	A*	A*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
225	2.2 μF								A*	A*	A*	A*	A*	A*	A*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
335	3.3 μF															A*	A*																																
475	4.7 μF															A	A																																
106	10 μF															A	A																																

Code = capacitance in pF (two significant digits + number of zeros; R = decimal point). Letters = thickness code T, see the Dimensions table; blank = not listed. * = the customer must provide the usage scenario and related conditions for factory confirmation (original chart note). Values are for reference only; the actual capacitance range depends on the use requirement.

Dielectric		C0G				X7R				X7S				X7T				X6S				X5R																											
Code	Cap./V _{DC}	50	025	020	010	0050	35	25	50	025	020	010	0050	35	25	16	10	6.3	50	025	020	010	0050	35	25	16	10	6.3	4	50	025	020	010	0050	35	25	16	10	6.3	50	025	020	010	0050	35	25	16	10	6.3
0R2	0.2 pF	C	C	C	C	C	C	C																																									
0R25	.25 pF	C	C	C	C	C	C	C																																									
0R3	0.3 pF	C	C	C	C	C	C	C																																									
0R4	0.4 pF	C	C	C	C	C	C	C																																									
0R5	0.5 pF	C	C	C	C	C	C	C																																									
R56	.56 pF	C	C	C	C	C	C	C																																									
0R6	0.6 pF	C	C	C	C	C	C	C																																									
R68	.68 pF	C	C	C	C	C	C	C																																									
0R7	0.7 pF	C	C	C	C	C	C	C																																									
R75	.75 pF	C	C	C	C	C	C	C																																									
0R8	0.8 pF	C	C	C	C	C	C	C																																									
R82	.82 pF	C	C	C	C	C	C	C																																									
0R9	0.9 pF	C	C	C	C	C	C	C																																									
1R0	1.0 pF	C	C	C	C	C	C	C																																									
1R1	1.1 pF	C	C	C	C	C	C	C																																									
1R2	1.2 pF	C	C	C	C	C	C	C																																									
1R3	1.3 pF	C	C	C	C	C	C	C																																									
1R5	1.5 pF	C	C	C	C	C	C	C																																									
1R6	1.6 pF	C	C	C	C	C	C	C																																									
1R8	1.8 pF	C	C	C	C	C	C	C																																									
2R0	2.0 pF	C	C	C	C	C	C	C																																									
2R2	2.2 pF	C	C	C	C	C	C	C																																									
2R4	2.4 pF	C	C	C	C	C	C	C																																									
2R5	2.5 pF	C	C	C	C	C	C	C																																									
2R7	2.7 pF	C	C	C	C	C	C	C																																									
3R0	3.0 pF	C	C	C	C	C	C	C																																									
3R3	3.3 pF	C	C	C	C	C	C	C																																									
3R5	3.5 pF	C	C	C	C	C	C	C																																									
3R6	3.6 pF	C	C	C	C	C	C	C																																									
3R9	3.9 pF	C	C	C	C	C	C	C																																									
4R0	4.0 pF	C	C	C	C	C	C	C																																									
4R3	4.3 pF	C	C	C	C	C	C	C																																									
4R7	4.7 pF	C	C	C	C	C	C	C																																									
5R0	5.0 pF	C	C	C	C	C	C	C																																									
5R1	5.1 pF	C	C	C	C	C	C	C																																									
5R6	5.6 pF	C	C	C	C	C	C	C																																									
6R0	6.0 pF	C	C	C	C	C	C	C																																									
6R2	6.2 pF	C	C	C	C	C	C	C																																									
6R8	6.8 pF	C	C	C	C	C	C	C																																									
7R0	7.0 pF	C	C	C	C	C	C	C																																									
7R5	7.5 pF	C	C	C	C	C	C	C																																									
8R0	8.0 pF	C	C	C	C	C	C	C																																									
8R2	8.2 pF	C	C	C	C	C	C	C																																									
9R0	9.0 pF	C	C	C	C	C	C	C																																									
9R1	9.1 pF	C	C	C	C	C	C	C																																									
100	10 pF	C	C	C	C	C	C	C																																									
110	11 pF	C	C	C	C	C	C	C																																									
120	12 pF	C	C	C	C	C	C	C																																									
130	13 pF	C	C	C	C	C	C	C																																									
140	14 pF	C	C	C	C	C	C	C																																									
150	15 pF	C	C	C	C	C	C	C																																									
160	16 pF	C	C	C	C	C	C	C																																									
180	18 pF	C	C	C	C	C	C	C																																									
200	20 pF	C	C	C	C	C	C	C																																									

[illegible]

Dielectric		C0G									X7R									X7S																
Code	Cap. / V _{DC}	630	500	250	200	100	50	35	25	16	1000	630	500	250	200	100	50	35	25	16	10	6.3	1000	630	500	250	200	100	50	35	25	16	10	6.3		
393	39 nF															F	D/F	D/F	D	D	D	D	D				F	D/F	D/F	D	D	D	D	D	D	
473	47 nF															F	D/F	D/F	D	D	D	D	D				F	D/F	D/F	D	D	D	D	D	D	
563	56 nF															F	D/F	D/F	D	D	D	D	D				F	D/F	D/F	D	D	D	D	D	D	
683	68 nF															F	D/F	D/F	D	D	D	D	D				F	D/F	D/F	D	D	D	D	D	D	
823	82 nF															F	F	D/F	D	D	D	D	D				F	F	D/F	D	D	D	D	D	D	
104	100 nF															F	F	D/F	D	D	D	D	D				F	F	D/F	D	D	D	D	D	D	
124	120 nF																F	D	D	D	D	D	D					F	D	D	D	D	D	D	D	
154	150 nF																F	D/F	D/F	D	D	D	D					F	D/F	D/F	D	D	D	D	D	
184	180 nF																F	D/F	D/F	D	D	D	D					F	D/F	D/F	D	D	D	D	D	
224	220 nF																F	D/F	D/F	D	D	D	D					F	D/F	D/F	D	D	D	D	D	
274	270 nF																F	D/F	D/F	D	D	D	D					F	D/F	D/F	D	D	D	D	D	
334	330 nF																F	D/F	D/F	D	D	D	D					F	D/F	D/F	D	D	D	D	D	
394	390 nF																F	D/F	D/F	D	D	D	D					F	D/F	D/F	D	D	D	D	D	
474	470 nF																F	D/F	D/F	D	D	D	D					F	D/F	D/F	D	D	D	D	D	
564	560 nF																F	D/F	D/F	D	D	D	D					F	D/F	D/F	D	D	D	D	D	
684	680 nF																F	D/F	D/F	D	D	D	D					F	D/F	D/F	D	D	D	D	D	
824	820 nF																F	F	D/F	D/F	D/F	D/F	D/F					F	F	D/F	D/F	D/F	D/F	D/F	D/F	
105	1 μF																F	F	D/F	D/F	D/F	D/F	D/F					F	F	D/F	D/F	D/F	D/F	D/F	D/F	
155	1.5 μF																F	F	F	F	F	F	F					F	F	F	F	F	F	F	F	
225	2.2 μF																F	F	F	F	F	F	F					F	F	F	F	F	F	F	F	
335	3.3 μF																F*	F	F	F	F	F	F					F*	F	F	F	F	F	F	F	
475	4.7 μF																F*	F	F	F	F	F	F					F*	F	F	F	F	F	F	F	
685	6.8 μF																		F*	F*	F	F	F							F*	F	F	F	F	F	
106	10 μF																		F*	F*	F*	F*	F*							F*	F	F	F	F	F	
206	20 μF																						F*	F*									F*	F*	F*	F*
226	22 μF																						F*	F*									F*	F*	F*	F*
476	47 μF																						F*	F*												

Code = capacitance in pF (two significant digits + number of zeros; R = decimal point). Letters = thickness code T, see the Dimensions table; two or three codes (e.g. B/D) = all listed in the original chart; blank = not listed. * = the customer must provide the usage scenario and related conditions for factory confirmation (original chart note). Red letters = one of several thickness designs for the same specification; prefer the black entry — red has a long delivery time (original chart note). Values are for reference only; the actual capacitance range depends on the use requirement.

[illegible]

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[illegible]

Code = capacitance in pF (two significant digits + number of zeros; R = decimal point). Letters = thickness code T, see the Dimensions table; two or three codes (e.g. D/F) = all listed in the original chart; blank = not listed. * = the customer must provide the usage scenario and related conditions for factory confirmation (original chart note). Red letters = one of several thickness designs for the same specification; prefer the black entry — red has a long delivery time (original chart note). Values are for reference only; the actual capacitance range depends on the use requirement.



Dielectric		X7T												X6S												X5R															
Code	Cap. / V _{DC}	2000	1000	630	500	250	200	100	50	35	25	16	10	6.3	4	2000	1000	630	500	250	200	100	50	35	25	16	10	6.3	2000	1000	630	500	250	200	100	50	35	25	16	10	6.3
101	100 pF	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F
121	120 pF	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F
151	150 pF	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F
181	180 pF	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F
201	200 pF	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F
221	220 pF	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F
241	240 pF	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F
271	270 pF	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F
331	330 pF	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F
391	390 pF	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F
471	470 pF	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F
511	510 pF	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F
561	560 pF	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F
681	680 pF	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F
821	820 pF	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F	F	F	F	F	F	F	D/F	D/F	D/F	D/F	D/F	D/F	D/F
102	1 nF	F	F	F	F	F	F	D																																	

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1210 (3225) — X7R, X7S

Dielectric		X7R													X7S												
Code	Cap. / V _{DC}	2000	1000	630	500	250	200	100	50	35	25	16	10	6.3	2000	1000	630	500	250	200	100	50	35	25	16	10	6.3
221	220 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
271	270 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
331	330 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
391	390 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
471	470 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
561	560 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
681	680 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
821	820 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
102	1 nF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
152	1.5 nF	F#/G#	F	F	F	F	F	F	F	F	F	F	F	F	F#/G#	F	F	F	F	F	F	F	F	F	F	F	F
182	1.8 nF	F#/G#	F	F	F	F	F	F	F	F	F	F	F	F	F#/G#	F	F	F	F	F	F	F	F	F	F	F	F
222	2.2 nF	F#/G#	F	F	F	F	F	F	F	F	F	F	F	F	F#/G#	F	F	F	F	F	F	F	F	F	F	F	F
272	2.7 nF	H#/G#	F	F	F	F	F	F	F	F	F	F	F	F	H#/G#	F	F	F	F	F	F	F	F	F	F	F	F
332	3.3 nF	H/G	F	F	F	F	F	F	F	F	F	F	F	F	H/G	F	F	F	F	F	F	F	F	F	F	F	F
472	4.7 nF	G	F	F	F	F	F	F	F	F	F	F	F	F	G	F	F	F	F	F	F	F	F	F	F	F	F
562	5.6 nF	G#	F	F	F	F	F	F	F	F	F	F	F	F	G#	F	F	F	F	F	F	F	F	F	F	F	F
682	6.8 nF	G#	F	F	F	F	F	F	F	F	F	F	F	F	G#	F	F	F	F	F	F	F	F	F	F	F	F
103	10 nF	G#	F	F	F	F	F	F	F	F	F	F	F	F	G#	F	F	F	F	F	F	F	F	F	F	F	F
153	15 nF		F	F	F	F	F	F	F	F	F	F	F	F		F	F	F	F	F	F	F	F	F	F	F	F
223	22 nF		H	H	H	H	H	H	H	H	H	H	H	H		H	H	H	H	H	H	H	H	H	H	H	H
333	33 nF		M	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G		M	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G
473	47 nF			H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G			H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G
563	56 nF			H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G			H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G
683	68 nF			H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G			H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G
104	100 nF			H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G			H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G
154	150 nF						H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G					H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G
224	220 nF						H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G					H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G
334	330 nF						H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G					H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G
474	470 nF						H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G					H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G
684	680 nF							H/G	H/G	H/G	H/G	H/G	H/G	H/G							H/G	H/G	H/G	H/G	H/G	H/G	H/G
105	1 μF							H/G	H/G	H/G	H/G	H/G	H/G	H/G							H/G	H/G	H/G	H/G	H/G	H/G	H/G
225	2.2 μF							M	M	M	M	M	M	M							M	M	M	M	M	M	M
475	4.7 μF							M*	M*	M*	M*	M*	M*	M*							M	M	M	M	M	M	M
106	10 μF								M*	M*	M*	M*	M*	M*								M	M	M	M	M	M
226	22 μF										M*	M*	M*	M*									M	M	M	M	M
476	47 μF											M*	M*	M*											M	M	M
107	100 μF													M*													M*

Code = capacitance in pF (two significant digits + number of zeros; R = decimal point). Letters = thickness code T, see the Dimensions table; two or three codes (e.g. H/G) = all listed in the original chart; blank = not listed. * = the customer must provide the usage scenario and related conditions for factory confirmation (original chart note). # = can only be shipped in tolerance M (±20 %) (original chart note). Red letters = one of several thickness designs for the same specification; prefer the black entry — red has a long delivery time (original chart note). Orange cell = special specification with a minimum order quantity; for 1210 and above the minimum order quantity is 30,000 pcs (original chart note). Values are for reference only; the actual capacitance range depends on the use requirement.

1210 (3225) — X7T, X6S

Dielectric		X7T														X6S																
Code	Cap. / V _{DC}	2000	1000	630	500	250	200	100	50	35	25	16	10	6.3	4	2000	1000	630	500	250	200	100	50	35	25	16	10	6.3	4	2.5		
221	220 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F		
271	270 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F		
331	330 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F		
391	390 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F		
471	470 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F		
561	560 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F		
681	680 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F		
821	820 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F		
102	1 nF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F		
152	1.5 nF	F#/G#	F	F	F	F	F	F	F	F	F	F	F	F	F	F#/G#	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	
182	1.8 nF	F#/G#	F	F	F	F	F	F	F	F	F	F	F	F	F	F#/G#	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	
222	2.2 nF	F#/G#	F	F	F	F	F	F	F	F	F	F	F	F	F	F#/G#	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	
272	2.7 nF	H#/G#	F	F	F	F	F	F	F	F	F	F	F	F	F	H#/G#	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	
332	3.3 nF	H/G	F	F	F	F	F	F	F	F	F	F	F	F	F	H/G	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	
472	4.7 nF	G	F	F	F	F	F	F	F	F	F	F	F	F	F	G	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	
562	5.6 nF	G#	F	F	F	F	F	F	F	F	F	F	F	F	F	G#	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	
682	6.8 nF	G#	F	F	F	F	F	F	F	F	F	F	F	F	F	G#	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	
103	10 nF	G#	F	F	F	F	F	F	F	F	F	F	F	F	F	G#	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	
153	15 nF		F	F	F	F	F	F	F	F	F	F	F	F	F		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	
223	22 nF		H	H	H	H	H	H	H	H	H	H	H	H	H		H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	
333	33 nF		M	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G		M	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	
473	47 nF			H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G			H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	
563	56 nF			H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G			H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	
683	68 nF			H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G			H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	
104	100 nF			H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G			H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	
154	150 nF				H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G				H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	
224	220 nF				H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G				H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	
334	330 nF				H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G				H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	
474	470 nF				H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G				H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	
684	680 nF					H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G					H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	
105	1 μF					H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G					H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	
225	2.2 μF						M	M	M	M	M	M	M	M	M						M	M	M	M	M	M	M	M	M	M	M	
475	4.7 μF						M	M	M	M	M	M	M	M	M						M	M	M	M	M	M	M	M	M	M	M	
106	10 μF							M	M		M	M	M	M	M							M	M	M	M	M	M	M	M	M	M	
226	22 μF										M	M	M	M	M									M	M	M	M	M	M	M	M	
476	47 μF											M	M	M	M										M	M	M	M	M	M	M	
107	100 μF												M	M	M												M	M	M	M	M	

Code = capacitance in pF (two significant digits + number of zeros; R = decimal point). Letters = thickness code T, see the Dimensions table; two or three codes (e.g. H/G) = all listed in the original chart; blank = not listed. # = can only be shipped in tolerance M (±20 %) (original chart note). Red letters = one of several thickness designs for the same specification; prefer the black entry — red has a long delivery time (original chart note). Orange cell = special specification with a minimum order quantity; for 1210 and above the minimum order quantity is 30,000 pcs (original chart note). Values are for reference only; the actual capacitance range depends on the use requirement.

1210 (3225) — X5R

Dielectric		X5R												
Code	Cap. / V _{DC}	2000	1000	630	500	250	200	100	50	35	25	16	10	6.3
221	220 pF	F	F	F	F	F	F	F	F	F	F	F	F	F
271	270 pF	F	F	F	F	F	F	F	F	F	F	F	F	F
331	330 pF	F	F	F	F	F	F	F	F	F	F	F	F	F
391	390 pF	F	F	F	F	F	F	F	F	F	F	F	F	F
471	470 pF	F	F	F	F	F	F	F	F	F	F	F	F	F
561	560 pF	F	F	F	F	F	F	F	F	F	F	F	F	F
681	680 pF	F	F	F	F	F	F	F	F	F	F	F	F	F
821	820 pF	F	F	F	F	F	F	F	F	F	F	F	F	F
102	1 nF	F	F	F	F	F	F	F	F	F	F	F	F	F
152	1.5 nF	F#/G#	F	F	F	F	F	F	F	F	F	F	F	F
182	1.8 nF	F#/G#	F	F	F	F	F	F	F	F	F	F	F	F
222	2.2 nF	F#/G#	F	F	F	F	F	F	F	F	F	F	F	F
272	2.7 nF	H#/G#	F	F	F	F	F	F	F	F	F	F	F	F
332	3.3 nF	H/G	F	F	F	F	F	F	F	F	F	F	F	F
472	4.7 nF	G	F	F	F	F	F	F	F	F	F	F	F	F
562	5.6 nF	G#	F	F	F	F	F	F	F	F	F	F	F	F
682	6.8 nF	G#	F	F	F	F	F	F	F	F	F	F	F	F
103	10 nF	G#	F	F	F	F	F	F	F	F	F	F	F	F
153	15 nF		F	F	F	F	F	F	F	F	F	F	F	F
223	22 nF		H	H	H	H	H	H	H	H	H	H	H	H
333	33 nF		M	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G
473	47 nF			H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G
563	56 nF			H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G
683	68 nF			H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G
104	100 nF			H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G
154	150 nF					H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G
224	220 nF					H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G
334	330 nF					H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G
474	470 nF					H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G	H/G
684	680 nF							H/G	H/G	H/G	H/G	H/G	H/G	H/G
105	1 μF							H/G	H/G	H/G	H/G	H/G	H/G	H/G
225	2.2 μF							M	M	M	M	M	M	M
475	4.7 μF							M	M	M	M	M	M	M
106	10 μF							M	M	M	M	M	M	M
226	22 μF								M	M	M	M	M	M
476	47 μF									M	M	M	M	M
107	100 μF												M	M

Code = capacitance in pF (two significant digits + number of zeros; R = decimal point). Letters = thickness code T, see the Dimensions table; two or three codes (e.g. H/G) = all listed in the original chart; blank = not listed. # = can only be shipped in tolerance M (±20 %) (original chart note). Red letters = one of several thickness designs for the same specification; prefer the black entry — red has a long delivery time (original chart note). Orange cell = special specification with a minimum order quantity; for 1210 and above the minimum order quantity is 30,000 pcs (original chart note). Values are for reference only; the actual capacitance range depends on the use requirement.

1812 (4532) — X7R, X7S

Dielectric		X7R													X7S												
Code	Cap. / V _{DC}	2000	1000	630	500	250	200	100	50	35	25	16	10	6.3	2000	1000	630	500	250	200	100	50	35	25	16	10	6.3
471	470 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
561	560 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
681	680 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
821	820 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
102	1 nF	F/H/G	F/H/G	F/H/G	F/H/G	F	F	F	F	F	F	F	F	F	F/H/G	F/H/G	F/H/G	F/H/G	F	F	F	F	F	F	F	F	F
222	2.2 nF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
332	3.3 nF	H/G	G	G	G	F	F	F	F	F	F	F	F	F	H/G	G	G	G	F	F	F	F	F	F	F	F	F
472	4.7 nF	H/G	G	G	G	F	F	F	F	F	F	F	F	F	H/G	G	G	G	F	F	F	F	F	F	F	F	F
562	5.6 nF	H/G	G	G	G	F	F	F	F	F	F	F	F	F	H/G	G	G	G	F	F	F	F	F	F	F	F	F
682	6.8 nF	H/G	G	G	G	F	F	F	F	F	F	F	F	F	H/G	G	G	G	F	F	F	F	F	F	F	F	F
103	10 nF	H/G	G	G	G	F	F	F	F	F	F	F	F	F	H/G	G	G	G	F	F	F	F	F	F	F	F	F
153	15 nF		G	G	G	F	F	F	F	F	F	F	F	F		G	G	G	F	F	F	F	F	F	F	F	F
223	22 nF		G	G	G	F	F	F	F	F	F	F	F	F		G	G	G	F	F	F	F	F	F	F	F	F
333	33 nF		G	G	G	F	F	F	F	F	F	F	F	F		G	G	G	F	F	F	F	F	F	F	F	F
473	47 nF		G	G	G	F	F	F	F	F	F	F	F	F		G	G	G	F	F	F	F	F	F	F	F	F
563	56 nF		G#	G	G	F	F	F	F	F	F	F	F	F		G#	G	G	F	F	F	F	F	F	F	F	F
683	68 nF			G	G	F	F	F	F	F	F	F	F	F			G	G	F	F	F	F	F	F	F	F	F
104	100 nF			G	G	G	G	G	G	G	G	G	G	G			G	G	G	G	G	G	G	G	G	G	G
224	220 nF					G	G	G	G	G	G	G	G	G				G	G	G	G	G	G	G	G	G	G
334	330 nF					G	G	G	G	G	G	G	G	G					G	G	G	G	G	G	G	G	G
474	470 nF							G	G	G	G	G	G	G						G	G	G	G	G	G	G	G
684	680 nF							G	G	G	G	G	G	G							G	G	G	G	G	G	G
105	1 μF							H/G	H/G	H/G	H/G	H/G	H/G	H/G							H/G	H/G	H/G	H/G	H/G	H/G	H/G
225	2.2 μF																										
475	4.7 μF							M	M	M	M	M	M	M							M	M	M	M	M	M	M
106	10 μF								M	M	M	M	M	M								M	M	M	M	M	M
226	22 μF										M	M	M	M										M	M	M	M

Code = capacitance in pF (two significant digits + number of zeros; R = decimal point). Letters = thickness code T, see the Dimensions table; two or three codes (e.g. H/G) = all listed in the original chart; blank = not listed. # = can only be shipped in tolerance M (±20 %) (original chart note). Red letters = one of several thickness designs for the same specification; prefer the black entry — red has a long delivery time (original chart note). Orange cell = special specification with a minimum order quantity; for 1210 and above the minimum order quantity is 30,000 pcs (original chart note). Values are for reference only; the actual capacitance range depends on the use requirement.

1812 (4532) — X7T, X6S

Dielectric		X7T													X6S												
Code	Cap. / V _{DC}	2000	1000	630	500	250	200	100	50	35	25	16	10	6.3	2000	1000	630	500	250	200	100	50	35	25	16	10	6.3
471	470 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
561	560 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
681	680 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
821	820 pF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
102	1 nF	F/H/G	F/H/G	F/H/G	F/H/G	F	F	F	F	F	F	F	F	F	F/H/G	F/H/G	F/H/G	F/H/G	F	F	F	F	F	F	F	F	F
222	2.2 nF	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
332	3.3 nF	H/G	G	G	G	F	F	F	F	F	F	F	F	F	H/G	G	G	G	F	F	F	F	F	F	F	F	F
472	4.7 nF	H/G	G	G	G	F	F	F	F	F	F	F	F	F	H/G	G	G	G	F	F	F	F	F	F	F	F	F
562	5.6 nF	H/G	G	G	G	F	F	F	F	F	F	F	F	F	H/G	G	G	G	F	F	F	F	F	F	F	F	F
682	6.8 nF	H/G	G	G	G	F	F	F	F	F	F	F	F	F	H/G	G	G	G	F	F	F	F	F	F	F	F	F
103	10 nF	H/G	G	G	G	F	F	F	F	F	F	F	F	F	H/G	G	G	G	F	F	F	F	F	F	F	F	F
153	15 nF		G	G	G	F	F	F	F	F	F	F	F	F		G	G	G	F	F	F	F	F	F	F	F	F
223	22 nF		G	G	G	F	F	F	F	F	F	F	F	F		G	G	G	F	F	F	F	F	F	F	F	F
333	33 nF		G	G	G	F	F	F	F	F	F	F	F	F		G	G	G	F	F	F	F	F	F	F	F	F
473	47 nF		G	G	G	F	F	F	F	F	F	F	F	F		G	G	G	F	F	F	F	F	F	F	F	F
563	56 nF		G#	G	G	F	F	F	F	F	F	F	F	F		G#	G	G	F	F	F	F	F	F	F	F	F
683	68 nF			G	G	F	F	F	F	F	F	F	F	F			G	G	F	F	F	F	F	F	F	F	F
104	100 nF			G	G		G	G	G	G	G	G	G	G			G	G		G	G	G	G	G	G	G	G
224	220 nF					G	G	G	G	G	G	G	G	G				G	G	G	G	G	G	G	G	G	G
334	330 nF					G	G	G	G	G	G	G	G	G				G	G	G	G	G	G	G	G	G	G
474	470 nF							G	G	G	G	G	G	G							G	G	G	G	G	G	G
684	680 nF							G	G	G	G	G	G	G							G	G	G	G	G	G	G
105	1 μF								G	G	G	G	G	G							H/G	H/G	H/G	H/G	H/G	H/G	H/G
225	2.2 μF							H/G	H/G	H/G	H/G	H/G	H/G	H/G							H/G	H/G	H/G	H/G	H/G	H/G	H/G
475	4.7 μF							M	M	M	M	M	M	M							M	M	M	M	M	M	M
106	10 μF								M	M	M	M	M	M								M	M	M	M	M	M
226	22 μF										M	M	M	M										M	M	M	M

Code = capacitance in pF (two significant digits + number of zeros; R = decimal point). Letters = thickness code T, see the Dimensions table; two or three codes (e.g. H/G) = all listed in the original chart; blank = not listed. # = can only be shipped in tolerance M (±20 %) (original chart note). Orange cell = special specification with a minimum order quantity; for 1210 and above the minimum order quantity is 30,000 pcs (original chart note). Values are for reference only; the actual capacitance range depends on the use requirement.

1812 (4532) — X5R

Dielectric		X5R												
Code	Cap. / V _{DC}	2000	1000	630	500	250	200	100	50	35	25	16	10	6.3
471	470 pF	F	F	F	F	F	F	F	F	F	F	F	F	F
561	560 pF	F	F	F	F	F	F	F	F	F	F	F	F	F
681	680 pF	F	F	F	F	F	F	F	F	F	F	F	F	F
821	820 pF	F	F	F	F	F	F	F	F	F	F	F	F	F
102	1 nF	F/H/G	F/H/G	F/H/G	F/H/G	F	F	F	F	F	F	F	F	F
222	2.2 nF	F	F	F	F	F	F	F	F	F	F	F	F	F
332	3.3 nF	H/G	G	G	G	F	F	F	F	F	F	F	F	F
472	4.7 nF	H/G	G	G	G	F	F	F	F	F	F	F	F	F
562	5.6 nF	H/G	G	G	G	F	F	F	F	F	F	F	F	F
682	6.8 nF	H/G	G	G	G	F	F	F	F	F	F	F	F	F
103	10 nF	H/G	G	G	G	F	F	F	F	F	F	F	F	F
153	15 nF		G	G	G	F	F	F	F	F	F	F	F	F
223	22 nF		G	G	G	F	F	F	F	F	F	F	F	F
333	33 nF		G	G	G	F	F	F	F	F	F	F	F	F
473	47 nF		G	G	G	F	F	F	F	F	F	F	F	F
563	56 nF		G#	G	G	F	F	F	F	F	F	F	F	F
683	68 nF			G	G	F	F	F	F	F	F	F	F	F
104	100 nF			G	G	G	G	G	G	G	G	G	G	G
224	220 nF					G	G	G	G	G	G	G	G	G
334	330 nF					G	G	G	G	G	G	G	G	G
474	470 nF							G	G	G	G	G	G	G
684	680 nF							G	G	G	G	G	G	G
105	1 µF							G	G	G	G	G	G	G
225	2.2 µF							H/G	H/G	H/G	H/G	H/G	H/G	H/G
475	4.7 µF							M	M	M	M	M	M	M
106	10 µF								M	M		M	M	M
226	22 µF										M	M	M	M

Code = capacitance in pF (two significant digits + number of zeros; R = decimal point). Letters = thickness code T, see the Dimensions table; two or three codes (e.g. H/G) = all listed in the original chart; blank = not listed. # = can only be shipped in tolerance M (±20 %) (original chart note). Orange cell = special specification with a minimum order quantity; for 1210 and above the minimum order quantity is 30,000 pcs (original chart note). Values are for reference only; the actual capacitance range depends on the use requirement.

2220 (5750) — X7R, X7S

Dielectric		X7R										X7S									
Code	Cap. / V _{DC}	2000	1000	630	500	250	200	100	50	35	25	2000	1000	630	500	250	200	100	50	35	25
221	220 pF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
271	270 pF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
331	330 pF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
391	390 pF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
471	470 pF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
561	560 pF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
681	680 pF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
821	820 pF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
102	1 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
222	2.2 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
332	3.3 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
472	4.7 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
562	5.6 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
682	6.8 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
103	10 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
153	15 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
223	22 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
333	33 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
473	47 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
563	56 nF		G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M		G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
683	68 nF		G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M		G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
104	100 nF		G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M		G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
224	220 nF			G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M			G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
334	330 nF			G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M			G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
474	470 nF			G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M			G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
684	680 nF					G/M	G/M	G/M	G/M	G/M	G/M					G/M	G/M	G/M	G/M	G/M	G/M
105	1 μF					M	M	M	M	M	M					M	M	M	M	M	M
225	2.2 μF					M	M	M	M	M	M					M	M	M	M	M	M
335	3.3 μF						M	M	M	M	M						M	M	M	M	M
475	4.7 μF						M	M	M	M	M						M	M	M	M	M
685	6.8 μF							M	M	M	M							M	M	M	M
106	10 μF								M*	M	M								M	M	M
226	22 μF									M	M									M	M

Code = capacitance in pF (two significant digits + number of zeros; R = decimal point). Letters = thickness code T, see the Dimensions table; two or three codes (e.g. G/M) = all listed in the original chart; blank = not listed. * = the customer must provide the usage scenario and related conditions for factory confirmation (original chart note). Red letters = one of several thickness designs for the same specification; prefer the black entry — red has a long delivery time (original chart note). Orange cell = special specification with a minimum order quantity; for 1210 and above the minimum order quantity is 30,000 pcs (original chart note). Values are for reference only; the actual capacitance range depends on the use requirement.

2220 (5750) — X7T, X6S

Dielectric		X7T										X6S									
Code	Cap. / V _{DC}	2000	1000	630	500	250	200	100	50	35	25	2000	1000	630	500	250	200	100	50	35	25
221	220 pF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
271	270 pF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
331	330 pF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
391	390 pF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
471	470 pF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
561	560 pF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
681	680 pF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
821	820 pF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
102	1 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
222	2.2 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
332	3.3 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
472	4.7 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
562	5.6 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
682	6.8 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
103	10 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
153	15 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
223	22 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
333	33 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
473	47 nF	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
563	56 nF		G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M		G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
683	68 nF		G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M		G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
104	100 nF		G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M		G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
224	220 nF			G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M			G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
334	330 nF			G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M			G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
474	470 nF			G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M			G/M	G/M	G/M	G/M	G/M	G/M	G/M	G/M
684	680 nF					G/M	G/M	G/M	G/M	G/M	G/M					G/M	G/M	G/M	G/M	G/M	G/M
105	1 μF					M	M	M	M	M	M					M	M	M	M	M	M
225	2.2 μF					M	M	M	M	M	M					M	M	M	M	M	M
335	3.3 μF						M	M	M	M	M						M	M	M	M	M
475	4.7 μF						M	M	M	M	M						M	M	M	M	M
685	6.8 μF							M	M	M	M							M	M	M	M
106	10 μF								M	M	M								M	M	M
226	22 μF									M	M									M	M

Code = capacitance in pF (two significant digits + number of zeros; R = decimal point). Letters = thickness code T, see the Dimensions table; two or three codes (e.g. G/M) = all listed in the original chart; blank = not listed. Red letters = one of several thickness designs for the same specification; prefer the black entry — red has a long delivery time (original chart note). Orange cell = special specification with a minimum order quantity; for 1210 and above the minimum order quantity is 30,000 pcs (original chart note). Values are for reference only; the actual capacitance range depends on the use requirement.

5. Dimensions

Chip sizes: 0105, 0201, 0402, 0603, 0805, 1206, 1210, 1812 and 2220. ②

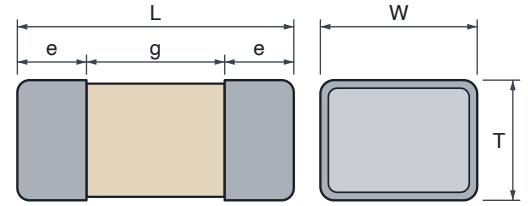
*1 Dimensions of parts of this size with a capacitance of 1 μ F and above.

*2 Dimensions of parts of this size with a capacitance of 100 nF and above.

*3 Dimensions of parts of this size with a capacitance of 4.7 μ F and above.

*4 Dimensions of parts of this size with a capacitance of 10 nF and above.

*5 Dimensions of parts of this size with a capacitance of 10 μ F and above.



Outline: length L, width W, thickness T, termination e, gap between terminations g

Size	L (mm)	W (mm)	e (mm)	g min. (mm)	T (mm)	T code
0105	0.40±0.02	0.20±0.02	0.06~0.15	0.1	0.20±0.02	Y
0105* ⁴	0.40-0.03/+0.1	0.20-0.03/+0.1	0.06~0.15	0.1	0.20-0.03/+0.1	Y
0201	0.60±0.03	0.30±0.03	0.1~0.2	0.2	0.30±0.03	Z
0201* ²	0.60-0.03/+0.1	0.30-0.03/+0.1	0.1~0.2	0.2	0.30-0.03/+0.1	Z
0402	1.00±0.10	0.50±0.10	0.15~0.3	0.4	0.50±0.10	A
0402* ²	1.00-0.05/+0.2	0.50-0.05/+0.2	0.15~0.3	0.4	0.50-0.05/+0.2	A
0402* ⁵	1.00-0.05/+0.25	0.50-0.05/+0.25	0.15~0.3	0.4	0.50-0.05/+0.25	A
0603	1.60±0.10	0.80±0.10	0.2~0.6	0.5	0.80±0.10	C
0603* ¹	1.60±0.20	0.80±0.20	0.2~0.6	0.5	0.80±0.20	C
0603* ³	1.60-0.1/+0.3	0.80-0.1/+0.3	0.2~0.6	0.5	0.80-0.1/+0.3	C
0805	2.00±0.10	1.25±0.10	0.2~0.7	0.7	0.60±0.10	B
					0.85±0.10	D
					1.25±0.10	F
0805* ¹	2.00±0.20	1.25±0.20	0.2~0.7	0.7	0.60±0.10	B
					0.85±0.20	D
					1.25±0.20	F
0805* ³	2.00-0.1/+0.3	1.25-0.1/+0.3	0.2~0.7	0.7	1.25-0.1/+0.3	F
1206	3.20±0.20	1.60±0.20	0.3~0.8	1.6	0.85±0.10	D
					1.00±0.10	E
					1.25±0.20	F
					1.60±0.20	H
1206* ¹	3.20±0.30	1.60±0.30	0.3~0.8	1.6	0.85±0.10	D
					1.00±0.10	E
					1.25±0.20	F
					1.60±0.30	H
1210	3.20±0.30	2.5±0.20	0.3~0.8	1.6	0.85±0.10	D
					1.25±0.20	F
					1.60±0.20	H
					2.00±0.20	G
					2.50±0.30	M
1210* ¹	3.20±0.40	2.5±0.30	0.3~0.8	1.6	0.85±0.10	D
					1.25±0.20	F
					1.60±0.30	H
					2.00±0.30	G
					2.50±0.30	M

Size	L (mm)	W (mm)	e (mm)	g min. (mm)	T (mm)	T code
1812	4.50±0.30	3.2±0.30	0.3~1.5	2.5	1.25±0.20	F
					1.60±0.20	H
					2.00±0.20	G
					2.50±0.30	M
1812 ^{*1}	4.50±0.40	3.2±0.40	0.3~1.5	2.5	1.25±0.20	F
					1.60±0.20	H
					2.00±0.20	G
					2.50±0.30	M
2220	5.70±0.40	5.0±0.40	0.3~1.1	3.5	1.25±0.20	F
					1.60±0.20	H
					2.00±0.20	G
					2.50±0.30	M



6. Specifications and test conditions

6.1 Appearance

Dielectric	Requirement	Test conditions
C0G, X7R, X5R, X7T, X6S, X7S	$l \leq 1/8L$, $w \leq 1/8W$, $t \leq 1/8T$ (None is acceptable; all are judged non-conforming.)	Visual inspection.

6.2 Dimensions

Dielectric	Requirement	Test conditions
C0G, X7R, X5R, X7T, X6S, X7S	Within the specified dimensions.	Measured with a micrometer. Source note: the original Chinese text specifies a micrometer; the original English text reads 'Using calipers on micrometer' (as printed). Measuring instrument subject to manufacturer confirmation.

6.3 Capacitance ①

Dielectric	Requirement	Test conditions
C0G	Within the specified tolerance. B: ± 0.1 pF; C: ± 0.25 pF; D: ± 0.5 pF; J: $\pm 5\%$	1.0 ± 0.2 Vrms, 1 MHz $\pm 10\%$ (C > 1000 pF: 1.0 ± 0.2 Vrms, 1 kHz $\pm 10\%$)
X7R, X5R, X7T, X6S, X7S	Within the specified tolerance. J: $\pm 5\%$; K: $\pm 10\%$; M: $\pm 20\%$	1.0 ± 0.2 Vrms, 1 kHz $\pm 10\%$ (Cp > 10 μ F: 0.5 ± 0.1 Vrms, 120 ± 24 Hz)

Remark: test temperature 25 ± 3 °C, test humidity < 70% RH. Class II dielectrics must be de-aged before measurement: heat-treat the capacitors at 150 °C for 1 hour and measure after 48 h. ③

6.4 Dissipation factor

Dielectric	Requirement	Test conditions
C0G	Cp < 30 pF: Q $\geq 400 + 20Cp$ Cp ≥ 30 pF: Q ≥ 1000	1.0 ± 0.2 Vrms, 1 MHz $\pm 10\%$ (Cp > 1 nF: 1.0 ± 0.2 Vrms, 1 kHz $\pm 10\%$)
X7R, X5R, X7T, X6S, X7S	DF limits: see the table below. ④	1.0 ± 0.2 Vrms, 1 kHz $\pm 10\%$ (Cp > 10 μ F: 0.5 ± 0.1 Vrms, 120 ± 24 Hz)

Remark: test temperature 25 ± 3 °C, test humidity < 70% RH. Class II dielectrics must be de-aged before measurement: heat-treat the capacitors at 150 °C for 1 hour and measure after 48 h. ③

DF limits, Class II (X7R, X5R, X7T, X6S, X7S) ④

Size	Rated voltage U_R	Capacitance	DF
0105	/	$C \leq 0.01 \mu F$	$\leq 7\%$
		$C > 0.01 \mu F$	$\leq 10\%$
0201	/	$C \leq 0.01 \mu F$	$\leq 7\%$
		$C > 0.01 \mu F$	$\leq 10\%$
0402	/	$C \leq 0.1 \mu F$	$\leq 7\%$
		$C > 0.1 \mu F$	$\leq 10\%$
0603	$\leq 25V$	$C \leq 0.47 \mu F$	$\leq 7\%$
		$C > 0.47 \mu F$	$\leq 10\%$
	> 25V	$C \leq 0.1 \mu F$	$\leq 5\%$
		$0.1 \mu F < C \leq 0.22 \mu F$	$\leq 7\%$
		$C > 0.22 \mu F$	$\leq 10\%$
Size	Rated voltage U_R	Capacitance	DF
0805	$\leq 25V$	$C \leq 1 \mu F$	$\leq 7\%$
		$C > 1 \mu F$	$\leq 10\%$
	> 25V	$C \leq 0.47 \mu F$	$\leq 7\%$
		$C > 0.47 \mu F$	$\leq 10\%$
1206	$\leq 25V$	$C < 2.2 \mu F$	$\leq 7\%$
		$2.2 \mu F \leq C \leq 47 \mu F$	$\leq 10\%$
	> 25V	$C < 1 \mu F$	$\leq 7\%$
		$1 \mu F \leq C \leq 47 \mu F$	$\leq 10\%$
1210	/	$C < 2.2 \mu F$	$\leq 7\%$
		$2.2 \mu F \leq C \leq 47 \mu F$	$\leq 10\%$
1812	/	$C < 2.2 \mu F$	$\leq 7\%$
		$2.2 \mu F \leq C \leq 47 \mu F$	$\leq 10\%$
2220	/	$C < 2.2 \mu F$	$\leq 7\%$
		$2.2 \mu F \leq C \leq 47 \mu F$	$\leq 10\%$

6.5 Insulation resistance

Dielectric	Requirement	Test conditions
C0G	More than 10 GΩ or 100 Ω·F/CR, whichever is smaller.	$U_R \leq 400$ V: test voltage = U_R $U_R > 400$ V: test voltage = 400 V Charging time: 60 ±5 s Charge/discharge current: ≤ 50 mA
X7R, X5R, X7T, X6S, X7S	$U_R \leq 50$ V: more than 10 GΩ or 100 Ω·F/CR, whichever is smaller.	$U_R \leq 50$ V: test voltage = U_R Charging time: 60 ±5 s Charge/discharge current: ≤ 50 mA
X7R, X5R, X7T, X6S, X7S	$U_R > 50$ V: more than 4 GΩ or 100 Ω·F/CR, whichever is smaller.	$U_R \leq 400$ V: test voltage = U_R $U_R > 400$ V: test voltage = 400 V Charging time: 60 ±5 s Charge/discharge current: ≤ 50 mA

Remark: test temperature 25 ±3 °C, test humidity < 70% RH.

6.6 Dielectric strength ⑥

Dielectric	Rated voltage range	Test method
C0G	$U_R \leq 50$ V	300% of rated voltage for 5 s; maximum current 50 mA
X7R, X5R, X7T, X6S, X7S	$U_R \leq 50$ V	250% of rated voltage for 5 s; maximum current 50 mA
C0G, X7R, X7S, X7T, X6S, X5R	100 V ≤ U_R < 500 V	200% of rated voltage for 5 s; maximum current 50 mA
	500 V ≤ U_R < 2000 V	150% of rated voltage for 5 s; maximum current 50 mA
	$U_R \geq 2000$ V	120% of rated voltage for 5 s; maximum current 50 mA

Attention: the dielectric strength test uses transient voltage.

6.7 Temperature coefficient of capacitance ③ ⑤

Dielectric	Requirement	Test conditions
C0G	Temperature coefficient within ±30 ppm/°C Capacitance drift within ±0.2% or ±0.05 pF	Measure the capacitance at the temperatures of the step table below, in sequence. Pre-treatment: 140 ~ 150 °C for 1 hour; measure after 24 h. 1) C0G: the capacitance drift is calculated by dividing the capacitance measured in step 3 by the difference between the maximum and minimum of the errors measured in steps 1, 3 and 5. The temperature coefficient is calculated with the capacitance measured in step 3 as reference. 2) X7R, X5R, X7T, X6S and X7S: the capacitance change over the temperature range, compared with the capacitance at 25 °C, shall be within the specified limits.
X7R, X5R	Capacitance change within ±15%	
X7T	Capacitance change within +22%, -33%	
X6S, X7S	Capacitance change within ±22%	

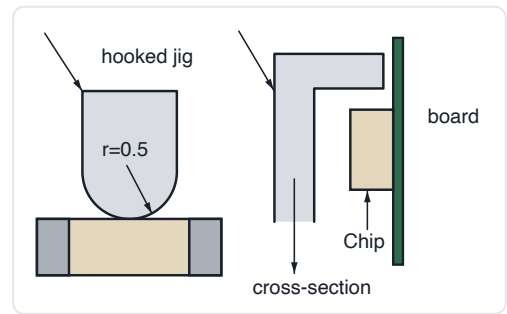
Remark: test voltage < 0.5 V for 0201/223 and above, 0402/104 and above, 0603/334 and above, 0805/105 and above, 1206/1210 225 and above (capacitance codes, see 4 · Nominal capacitance).

Step	C0G, X7R, X7T	X6S	X5R	X7S
1	25 ±2	25 ±2	25 ±2	25 ±2
2	-55 ±3	-55 ±3	-55 ±3	-55 ±3
3	25 ±2	25 ±2	25 ±2	25 ±2
4	125 ±3	105 ±3	85 ±3	125 ±3
5	25 ±2	25 ±2	25 ±2	25 ±2

Temperatures in °C.

6.8 Adhesion

Dielectric	Requirement	Test conditions
C0G, X7R, X5R, X7T, X6S, X7S	No removal of the terminations or other defects shall occur.	A pressing force of 6 N (0201: 2 N) is applied for 10 ± 1 s.



Adhesion test: hooked jig ($r = 0.5$) on the chip mounted on the board, cross-section

6.9 Solderability of terminations

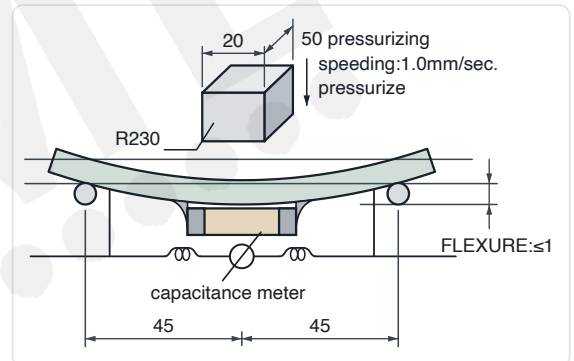
Dielectric	Requirement	Test conditions
C0G, X7R, X5R, X7T, X6S, X7S	At least 95% coverage of both terminations; less than 5% pinholes or rough spots.	Solder temperature: 245 ± 5 °C Dipping time: 2 ± 1 s Both terminations completely immersed in the solder.

6.10 Resistance to leaching ⑧

Dielectric	Requirement	Test conditions
C0G, X7R, X5R, X7T, X6S, X7S	At least 95% coverage of both terminations; less than 5% pinholes or rough spots. No visible damage (no cracks).	Preheating: 120 ~ 150 °C / 60 s Solder temperature: 270 ± 5 °C Dipping time: 10 ± 1 s Both terminations completely immersed in the solder.

6.11 Bending ⑧

Dielectric	Requirement	Test conditions
C0G	No visible damage Capacitance change within ±5.0% or ±0.5 pF, whichever is larger.	Solder the capacitor onto the test substrate and place it on the test stand. Press the middle of the substrate with the pressing rod at about 1.0 mm/s until the deflection reaches 1.0 mm, and hold for 5 ± 1 s. Remark: test board thickness 1.0 mm for 0105 / 0201 / 0402; 1.6 mm for 0603 / 0805 / 1206 and above.
X7R, X5R, X7T, X6S, X7S	No visible damage Capacitance change ≤ ±10%	



Bending test fixture (dimensions in mm as drawn): pressing rod R230, supports 45 + 45, deflection measured with capacitance meter connected

6.12 Resistance to soldering heat ③

Dielectric	Requirement	Test conditions
C0G	No visible damage Capacitance change within ±2.5% or ±0.25 pF, whichever is larger. DF: meets the initial specification. IR: meets the initial specification.	Soldering temperature: 270 ± 5 °C Preheating: 120 ~ 150 °C, 60 s Dipping time: 10 ± 1 s Measure after 24 ± 2 h (C0G) or 48 ± 4 h (X7R, X5R, X7S, X7T, X6S) at room temperature. Recovery under the standard conditions after the test. *Initial measurement of high-dielectric-constant types: heat treatment at 140 ~ 150 °C for 1 h, then 48 ± 4 h at room temperature; then perform the initial measurement.
X7R, X5R, X7T, X6S, X7S	No visible damage Capacitance change within ±7.5% DF: meets the initial specification. IR: meets the initial specification.	

6.13 Temperature cycle

Dielectric	Requirement	Test conditions
C0G	No visible damage Capacitance change within $\pm 2.5\%$ or ± 0.25 pF, whichever is larger.	5 cycles of the steps in the table below. Measure after 24 ± 2 h (C0G) or 48 ± 4 h (X7R, X5R, X7S, X7T, X6S) at room temperature. *Initial measurement of high-dielectric-constant types: heat treatment at $140 \sim 150$ °C for 1 h, then 48 ± 4 h at room temperature; then perform the initial measurement.
X7R, X5R, X7T, X6S, X7S	No visible damage Capacitance change within $\pm 7.5\%$	

Step	Temperature	Time
1	Lower category temperature $+0/-3$ °C	30 min
2	25 °C	1 min
3	Upper category temperature $+3/-0$ °C	30 min
4	25 °C	1 min

6.14 Moisture resistance, steady state

Dielectric	Requirement	Test conditions
C0G	No visible damage Capacitance change within $\pm 5\%$ or ± 0.5 pF, whichever is larger. $C_p < 10$ pF: $Q \geq 200 + 10C_p$ $10 \leq C_p < 30$ pF: $Q \geq 275 + 2.5C_p$ $C_p \geq 30$ pF: $Q \geq 350$ $IR \geq 1000$ M Ω or $10 \Omega \cdot F/CR$, whichever is smaller. ⑦	Test temperature: 40 ± 2 °C Humidity: $90 \sim 95\%$ RH Test time: 500 ± 12 h Measure after 24 ± 2 h (C0G) or 48 ± 4 h (X7R, X5R, X7S, X7T, X6S) at room temperature. *Initial measurement of high-dielectric-constant types: heat treatment at $140 \sim 150$ °C for 1 h, then 48 ± 4 h at room temperature; then perform the initial measurement.
X7R, X5R, X7T, X6S, X7S	No visible damage Capacitance change within $\pm 12.5\%$ DF: not more than 2 times the initial value $IR \geq 1000$ M Ω or $10 \Omega \cdot F/CR$, whichever is smaller. ⑦	

6.15 Damp heat with load

Dielectric	Requirement	Test conditions
C0G	No visible damage Capacitance change $\leq \pm 7.5\%$ or ± 0.75 pF, whichever is larger. $C_p < 30$ pF: $Q \geq 100 + 10/3 \cdot C_p$ $C_p \geq 30$ pF: $Q \geq 200$ $IR \geq 500$ M Ω or $5 \Omega \cdot F/CR$, whichever is smaller. ⑦	Test temperature: 40 ± 2 °C Humidity: $90 \sim 95\%$ RH Voltage: $U_R \leq 500$ V: 100% of the rated voltage; $U_R > 500$ V: 500 V Test time: 500 ± 12 h Charge / discharge current: 50 mA max. Measure after 24 ± 2 h (C0G) or 48 ± 4 h (X7R, X5R, X7S, X7T, X6S) at room temperature. *High-dielectric-constant types: before the test, heat treatment at 150 °C for 1 h, then 48 ± 4 h at room temperature, then measure; after the test, heat treatment at 150 °C for 1 h, then 48 ± 4 h at room temperature, then measure.
X7R, X5R, X7T, X6S, X7S	No visible damage Capacitance change $\leq \pm 12.5\%$ DF: not more than 2 times the initial value $IR \geq 500$ M Ω or $5 \Omega \cdot F/CR$, whichever is smaller. ⑦	

Remark: the test equipment can apply at most 600 V; this reliability test therefore applies only to low- and medium-voltage products (< 630 V), not to high-voltage products (≥ 630 V).

6.16 Life test ⑥

Dielectric	Requirement	Test conditions
C0G	No visible damage Capacitance change $\leq \pm 3\%$ or ± 0.3 pF, whichever is larger. $C_p \geq 30$ pF: $Q \geq 350$ $10 \text{ pF} \leq C_p < 30 \text{ pF}$: $Q \geq 275 + (2.5 \cdot C_p)$ $C_p < 10 \text{ pF}$: $Q \geq 200 + 10 \cdot C_p$ $IR \geq 1000 \text{ M}\Omega$ or $5 \text{ }\Omega \cdot \text{F/CR}$, whichever is smaller. ⑦	Test temperature: maximum operating temperature ± 3 °C Voltage: $U_R < 100 \text{ V}$: 150% of the rated voltage (*see remark) Test time: 1000 h Charge / discharge current: 50 mA max. Measure after 24 ± 2 h (C0G) or 48 ± 4 h (X7R, X5R, X7S, X7T, X6S) at room temperature. *High-dielectric-constant types: before the test, heat treatment at 150 °C for 1 h, then 48 ± 4 h at room temperature, then measure; after the test, heat treatment at 150 °C for 1 h, then 48 ± 4 h at room temperature, then measure.
X7R, X5R, X7T, X6S, X7S	No visible damage Capacitance change $\leq \pm 12.5\%$ DF: not more than 2 times the initial value $IR \geq 1000 \text{ M}\Omega$ or $5 \text{ }\Omega \cdot \text{F/CR}$, whichever is smaller. ⑦	

Remarks: for $U \sim R \sim \geq 100 \text{ V}$ the test voltage is $1 \times$ the rated voltage. *Tested at $1 \times$ rated voltage: 0201/104 and above; 0402/104, 0603/105, 0805/225, 1206/475, 1210/475, 1812/475 and 2220/475 at 25 V and above (voltage and capacitance).

KOME

7. Packaging

7.1 Bulk packaging

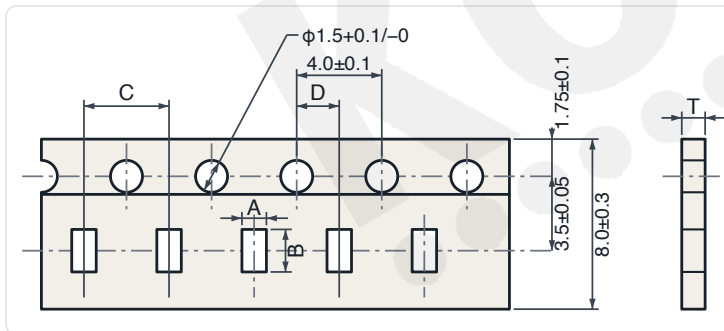
Standard packing: 10000 pcs (10 Kpcs) per bag; other quantities according to customer request.

7.2 Tape packaging

Size	Chip size (mm)			Quantity (pcs/reel)			
	L	W	T	Small reel, paper tape	Small reel, plastic tape	Large reel, paper tape	Large reel, plastic tape
0105	0.4	0.2	0.2	20,000	—	—	—
0201	0.6	0.3	0.3	15,000	—	60,000 (0201, 105 and above); 70,000 (others)	—
0402	1.0	0.5	0.5	10,000	—	50,000	—
0603	1.6	0.8	0.8	4,000	—	15,000	—
0805	2.0	1.25	≤ 0.85	4,000	—	15,000	—
			> 0.85	—	3,000	—	15,000 (thickness E); 10,000 (thickness F)
1206	3.2	1.6	≤ 0.85	4,000	—	15,000	—
			0.85 < T ≤ 1.25	—	3,000	—	10,000
			1.6	—	2,000	—	8,000
1210	3.2	2.5	≤ 2.0	—	2,000	—	—
			> 2.0	—	1,000	—	—
1812	4.5	3.2	≤ 2.0	—	1,000	—	—
			> 2.0	—	1,000	—	—
2220	5.7	5.0	≤ 1.25	—	1,000	—	—
			> 1.25	—	700	—	—

— = not offered in this reel / tape type (printed as "N/A" in the KOME original).

7.2.1 Paper tape dimensions

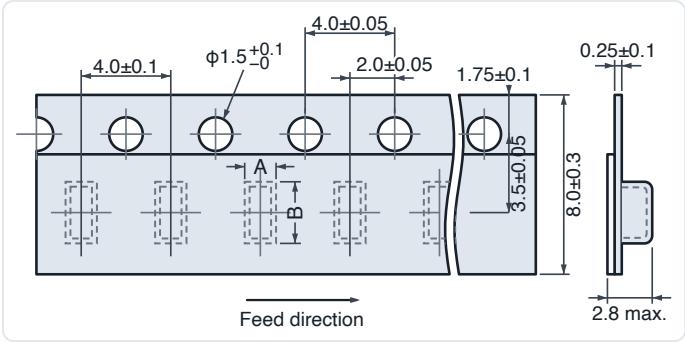


Paper tape (8 mm): top view and side view, dimensions as drawn in the source

Type	A	B	C	D	T
0105	0.23±0.03	0.43±0.03	2.0±0.05	2.0±0.05	0.50 max.
0201	0.40±0.09	0.70±0.09	2.0±0.05	2.0±0.05	0.60 max.
0402	0.65±0.15	1.20±0.15	2.0±0.05	2.0±0.05	0.80 max.
0603	1.05±0.15	1.90±0.15	4.0±0.10	2.0±0.10	1.10 max.
0805	1.55±0.15	2.3±0.15	4.0±0.10	2.0±0.10	1.10 max.
1206	2.00±0.04	3.5±0.04	4.0±0.10	2.0±0.10	1.10 max.

Unit: mm

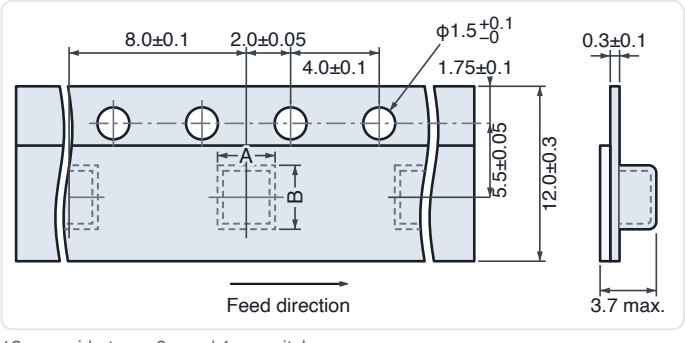
7.2.2 Embossed (plastic) tape dimensions ⑨



8 mm wide tape, 4 mm pitch

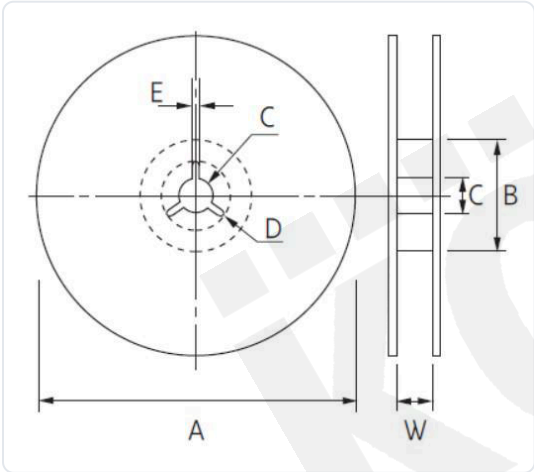
Size	A	B
0805	1.40±0.20	2.25±0.20
1206	1.90±0.20	3.50±0.20
1210	2.90±0.30	3.60±0.30
1812	3.60±0.20	5.00±0.20
2220	5.60±0.20	6.10±0.20

Unit: mm



12 mm wide tape, 8 mm / 4 mm pitch

7.2.3 Reel dimensions

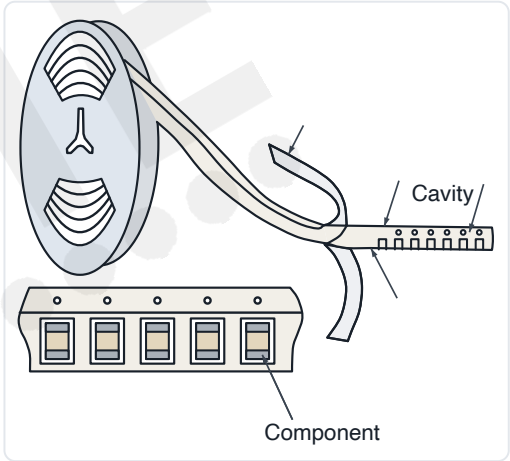


Reel, front view and side view

Reel	Tape width	A	B	C	D	E	W
7" reel	8 mm	φ178±2.0	min. φ50	φ13±0.5	21±0.8	2.0±0.5	10±1.5
	12 mm	φ178±2.0	min. φ50	φ13±0.5	21±0.8	2.0±0.5	13±0.5
13" reel	8 mm	φ330±2.0	min. φ70	φ13±0.5	21±0.8	2.0±0.5	10±1.5
	12 mm	φ330±2.0	min. φ70	φ13±0.5	21±0.8	2.0±0.5	13±0.5

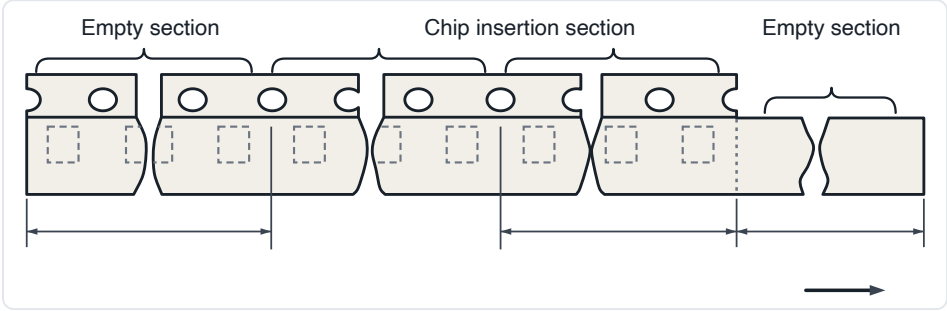
Unit: mm

7.2.4 Taping



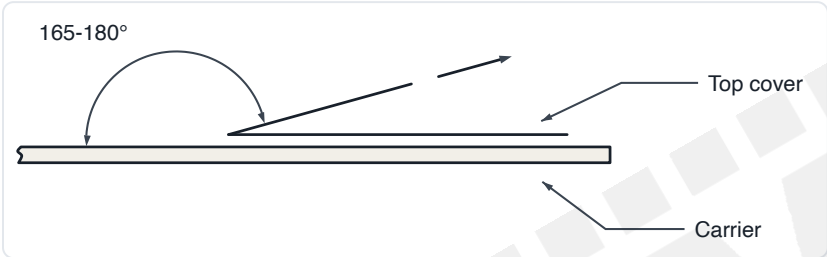
Components in the cavities of the carrier tape

7.2.5 Taping method



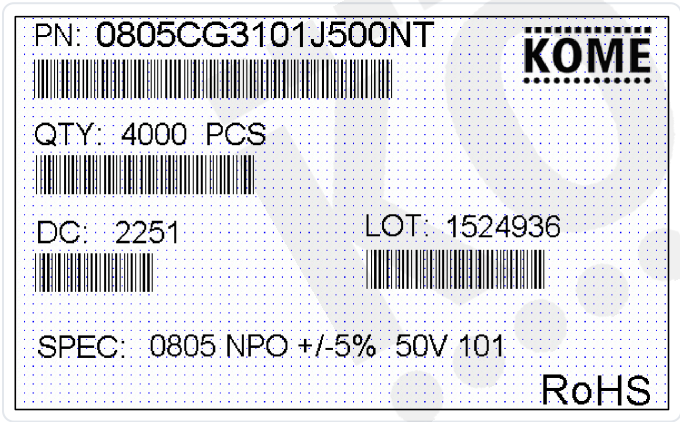
Leader and trailer: empty sections and chip insertion section

- (1) The tape is wound clockwise. The sprocket holes are on the right when the tape is pulled towards the user.
- (2) The top tape and base tape are not attached at the end of the tape for a minimum of 5 pitches. ⑧
- (3) A leader and empty tape sections are provided at the ends of the tape as shown above.
- (4) The top tape and bottom tape shall not protrude beyond the edges of the tape and shall not cover the sprocket holes.
- (5) Cumulative tolerance of the sprocket holes over 10 pitches: ±0.3 mm.
- (6) Peel-off force of the top tape: 0.1 to 0.6 N, in the direction shown below. ⑧



Peel-off direction: top cover tape peeled at 165–180° from the carrier tape

7.2.6 Reel label



Sample reel label (excerpt of the original sheet)

Label field	Example (as printed on the sample label)
PN	0805CG3101J500NT
QTY	4000 PCS
DC	2251
LOT	1524936
SPEC	0805 NPO +/-5% 50V 101

PN, QTY, DC and LOT are each followed by a barcode; the label also carries the KOME logo and the RoHS mark.

Part number on the label (PN), positions as in section 3:

1	2	3	4	5	6	7	8
0805	CG	3	101	J	500	N	T
Size	Dielectric	Digits	Capacitance	Tolerance	Rated voltage	Termination	Packaging

7.2.7 Outer packaging ⑫

7.2.7.1 Carton

7.2.7.1.1 Carton size	L	W	H
Dimensions	41.0 cm	38.5 cm	20.2 cm

7.2.7.1.2 Quantity: 240 Kpcs per carton.

1 inner box = 40,000 pcs; 1 carton = 40,000 pcs × 6 inner boxes = 240,000 pcs.

RoHS label applied according to customer request.

7.2.7.2 Inner box

7.2.7.2.1 Inner box size	L	W	H
Dimensions	18.5 cm	6.5 cm	19 cm

7.2.7.2.2 Quantity: 40 Kpcs per box.

1 reel = 4,000 pcs; 1 inner box = 4,000 pcs × 10 reels = 40,000 pcs.

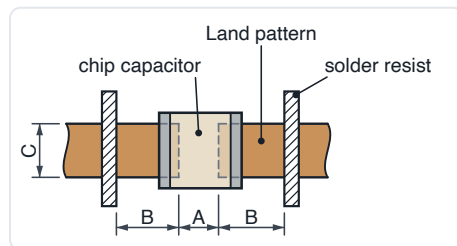
8. Precautions for use

8.1 PCB design

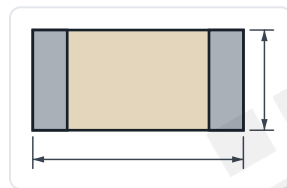
8.1.1 Land pattern design

The following drawings and tables show examples of recommended land patterns that prevent excessive solder (fillets higher than the component terminations). Examples of incorrect pattern designs are also shown.

Recommended land dimensions for typical chip capacitor land patterns on PCBs:



Land pattern: chip capacitor, land pattern, solder resist



Chip capacitor outline

Wave soldering (unit: mm)

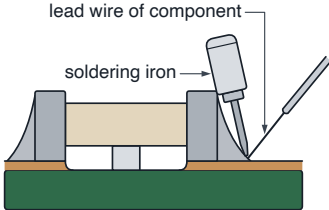
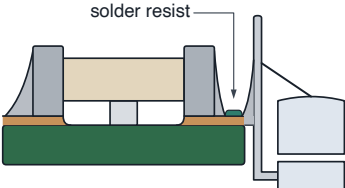
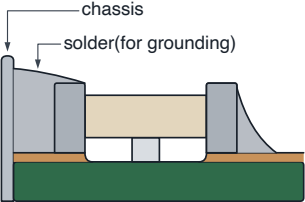
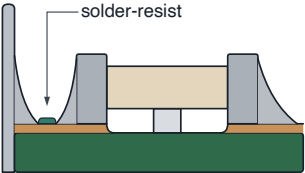
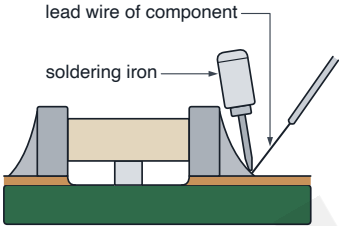
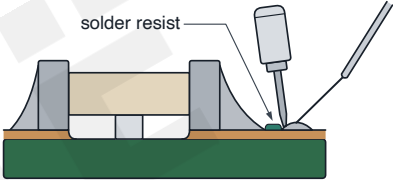
Size		0603	0805	1206
Chip size	L	1.6	2.0	3.2
	W	0.8	1.25	1.6
A		0.8~1.0	1.0~1.4	1.8~2.5
B		0.5~0.8	0.8~1.5	0.8~1.7
C		0.6~0.8	0.9~1.2	1.2~1.6

Reflow soldering (unit: mm)

Size		0201	0402	0603	0805	1206	1210
Chip size	L	0.6	1.0	1.6	2.00	3.2	3.2
	W	0.3	0.5	0.8	1.25	1.6	2.5
A		0.20~0.25	0.35~0.45	0.6~0.8	0.8~1.2	1.8~2.5	1.8~2.5
B		0.20~0.30	0.40~0.50	0.6~0.8	0.8~1.2	1.0~1.5	1.0~1.5
C		0.25~0.35	0.45~0.55	0.6~0.8	0.9~1.6	1.2~2.0	1.6~3.2

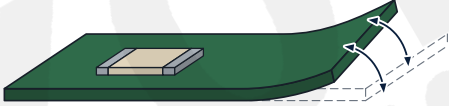
Excess solder can affect the ability of chips to withstand mechanical stress. Therefore, take proper precautions when designing land patterns.

Examples of good and bad solder application:

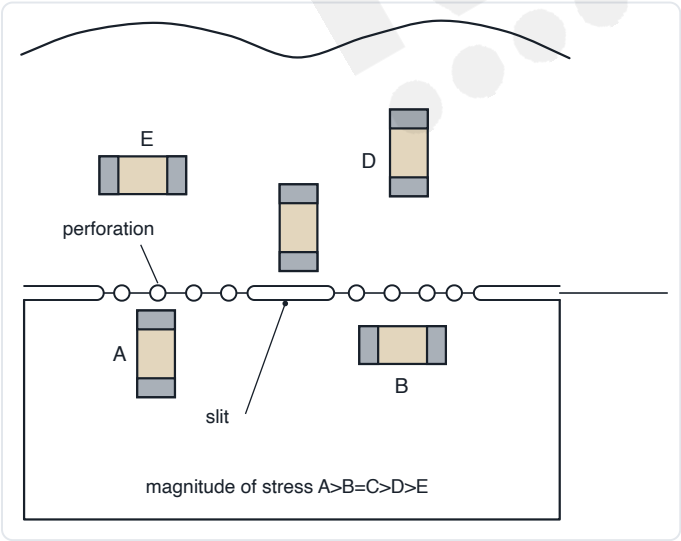
Item	Not recommended	Recommended
Mixed mounting of SMD and leaded components		
Component placement close to the chassis		
Hand soldering of leaded components near mounted components		

8.1.2 Pattern configurations ⑪

The following are examples of good and bad capacitor layouts. SMD capacitors should be located so as to minimise any mechanical stress from board warp or deflection.

	Not recommended	Recommended
Deflection of the board		

When laying out capacitors on a breakaway PC board, note that the mechanical stress depends on the capacitor layout. The example below shows recommendations for better design.



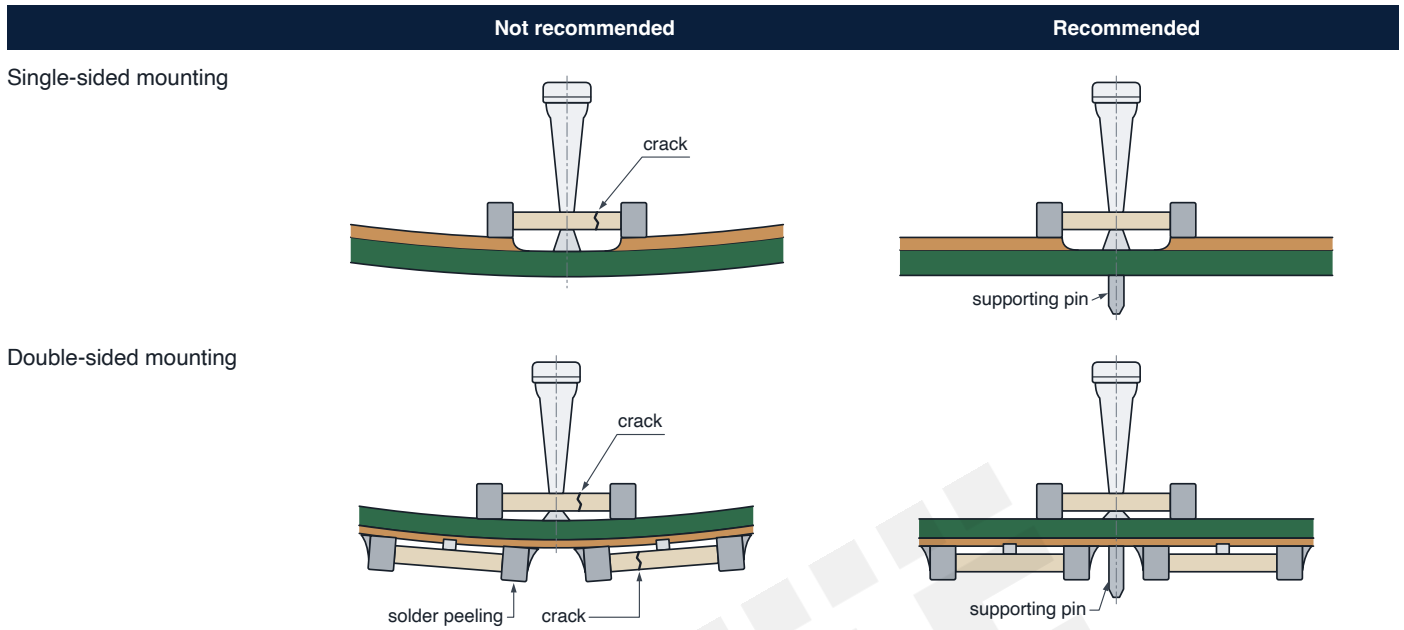
Capacitor positions A–E relative to the perforation and the slit; magnitude of stress $A > B = C > D > E$

When breaking PC boards along their perforations, the mechanical stress on the capacitors varies with the method used. The following methods are listed in order from least to most stressful: push-back, slit, V-grooving and perforation. Any SMD capacitor layout should therefore also take the PCB splitting procedure into account.

8.2 Automatic placement

Adjustment of the mounting machine:

- (1) Excessive impact load should not be imposed on the capacitors when they are mounted on the PC board.
- (2) The suction nozzles and positioning claws of the mouter must be inspected, maintained and replaced periodically.

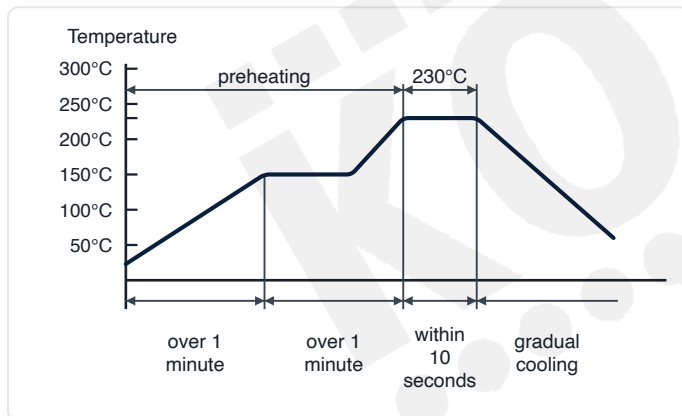


8.3 Recommended soldering profiles

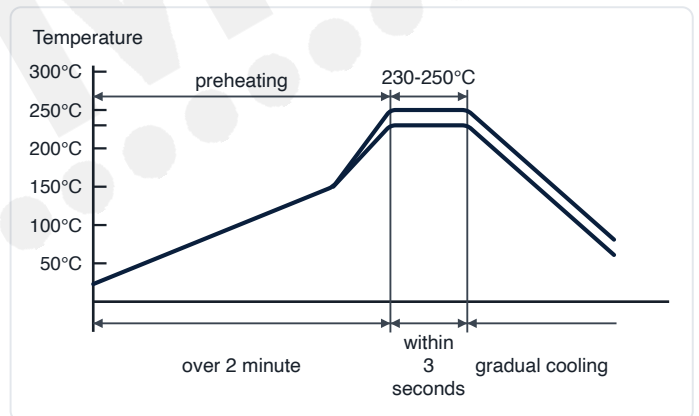
8.3.1 Notes

- (1) Reflow soldering is recommended for these products. (2) Larger case sizes are suitable for reflow soldering.

8.3.2 Sn-Pb soldering profiles



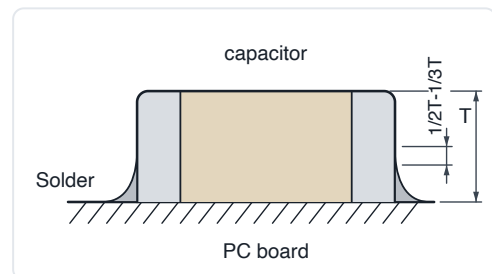
Reflow soldering (Sn-Pb)



Wave soldering (Sn-Pb)

Caution (reflow soldering):

- (1) Ideally, the solder fillet height is $1/2$ to $1/3$ of the capacitor thickness, as shown.
- (2) Excessive dwell times can impair solderability; keep the soldering time as close to the recommended times as possible.



Solder fillet height $1/2T-1/3T$

Caution (wave soldering) ⑩:

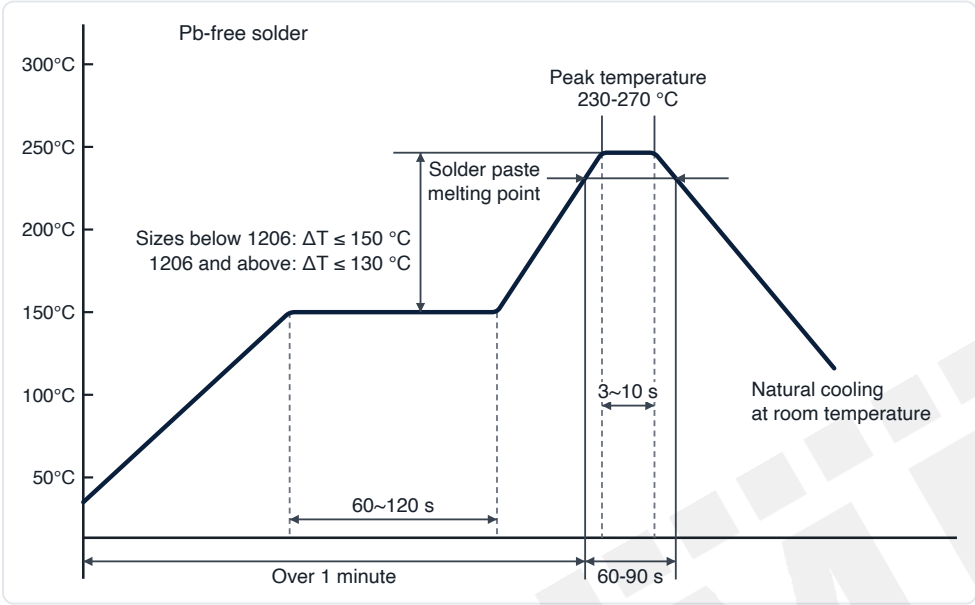
- (1) Make sure the capacitors are preheated sufficiently.
- (2) The temperature difference between preheating and soldering shall not exceed 150°C .
- (3) Cooling after soldering should be as gradual as possible.

Hand soldering

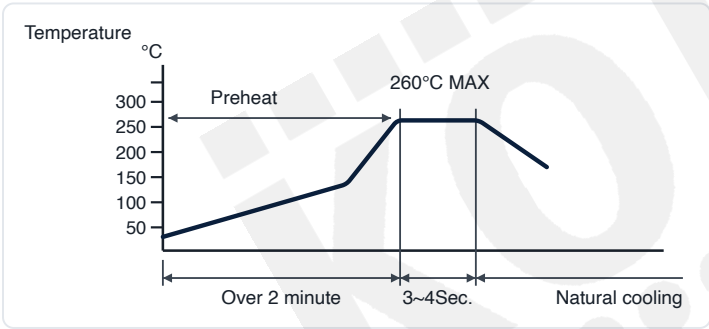
Preheating	Iron tip temperature	Iron power	Tip diameter	Soldering time	Amount of solder	Restriction
$\Delta T \leq 130\text{ }^{\circ}\text{C}$	350 $^{\circ}\text{C}$ max.	20 W max.	1 mm recommended	5 s max.	$\leq 1/2$ of chip thickness	Do not touch the ceramic body directly with the iron tip.

Caution: (1) Use a 20 W soldering iron with a maximum tip diameter of 1.0 mm. (2) The soldering iron should not directly touch the capacitor.

8.3.3 Pb-free soldering profiles ⑩



Reflow soldering (Pb-free)



Wave soldering

Capacitance range for wave and reflow soldering:

Soldering	0402 and below	0603	0805	1206	1210 and above
Wave soldering	—	105 and below	225 and below	475 and below	—
Reflow soldering	All	All	All	All	All

8.4 Handling

Breakaway PC boards (splitting along perforations):

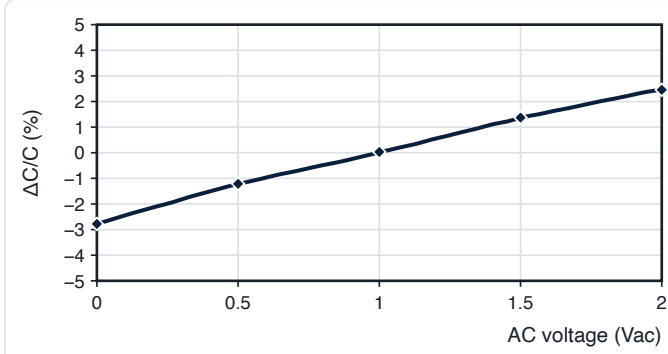
- (1) When splitting the PC board after mounting capacitors and other components, take care not to subject the board to deflection or twisting stress.
- (2) Board separation should not be done manually, but with an appropriate fixture.

8.5 Storage

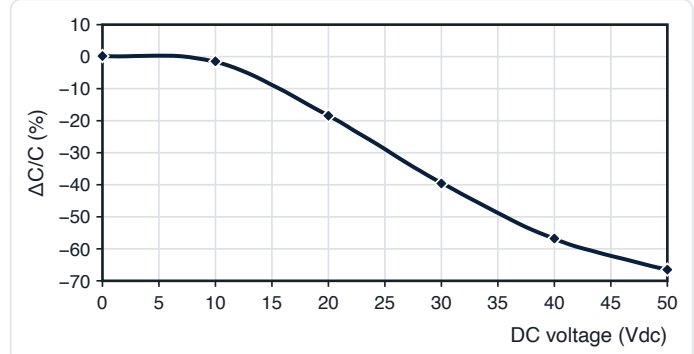
- (1) Storage conditions: temperature 5 ~ 40 $^{\circ}\text{C}$; humidity $\leq 70\%$ RH.
- (2) Do not open the tape until the parts are to be used, and use them within one year of the date printed on the reel.
- (3) Use the chips within 3 months after the tape is opened.
- (4) The capacitance of high-dielectric-constant capacitors (X7R, X7S, X7T, X6S, X5R) decreases gradually with time; take this into account in circuit design. If such a capacitance reduction occurs, a heat treatment at 150 $^{\circ}\text{C}$ for 1 hour will return the capacitance to its initial value.

Characteristic curves (example) ⑫

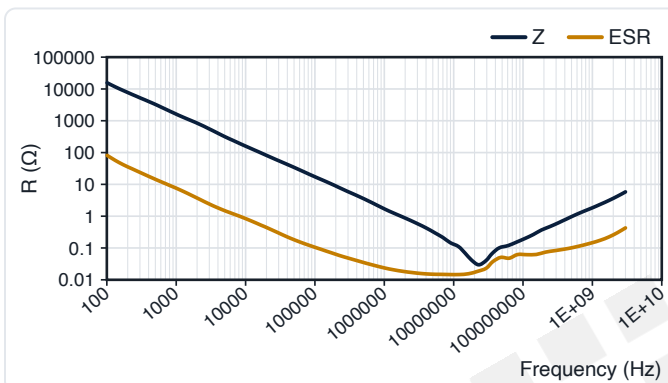
Example: 0603B6104K500NT (0603, X7R, 104 = 100 nF, $\pm 10\%$, 50 V, nickel barrier, taping).



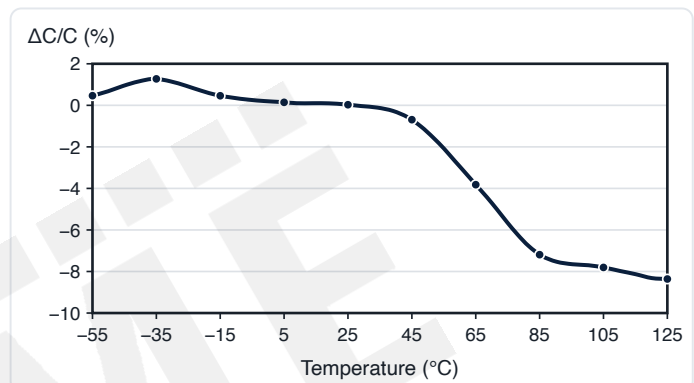
AC voltage characteristic: capacitance change vs AC voltage



DC bias characteristic: capacitance change vs DC voltage



Frequency characteristic: impedance Z and ESR vs frequency



Temperature characteristic: capacitance change vs temperature

Notes

- ① Part numbering: position 3 is printed only as "NO. OF total character (102=1000=4)", with no Chinese label; Y5V (code F) is listed under position 2 and in the temperature-characteristics table but has no capacitance range in section 4 and no requirements in section 6. Original print: code F "YSV" in the part-numbering table (position 2, original p. 4), "Y5V" in the temperature-characteristics table (original p. 5); Y5V is shown in position 2 here. Page 1 "Tabulated dielectrics" = the dielectrics of the capacitance range charts (section 4) only, not every orderable code — subject to manufacturer confirmation (not confirmed).
- ② The size-code table (section 3, position 1) lists 0105 to 3035 (0105 and 0201 from the new KOME book N/3; 1808, 2225 and 3035 from the old book only); the capacitance ranges (section 4), the dimensions (section 5) and tape packaging (7.2) cover 0105 to 2220 (new KOME book N/3). Page 1 "Tabulated case sizes" refers to these tables only; the four page-1 figures are the ranges tabulated in this document and do not imply that every combination of size, dielectric, voltage and capacitance is available — subject to manufacturer confirmation.
- ③ Reference temperature: 20 °C in the temperature-characteristics table, 25 °C in 6.7. De-ageing of Class II parts before measurement is given as 150 °C for 1 h then 48 h (6.3, 6.4), 140 ~ 150 °C for 1 h then 24 h (6.7), 140 ~ 150 °C for 1 h then 48 ± 4 h (6.12–6.14) and 150 °C for 1 h (8.5) — subject to manufacturer confirmation.
- ④ The DF limits (6.4) are taken over whole from the new KOME book N/3 (section 6.2), where the old book's overlap at 0.47 μF no longer occurs. The table ends at 47 μF (1206 to 2220), while the capacitance tables (section 4) include 100 μF and 220 μF parts; no DF limit is given for C > 47 μF — subject to manufacturer confirmation.
- ⑤ 6.7: the C0G drift calculation is given as printed (step-3 capacitance divided by the difference between the maximum and minimum errors of steps 1, 3 and 5) — subject to manufacturer confirmation.
- ⑥ No test condition is given for rated voltages above 50 V and below 100 V in 6.6, and 6.16 gives a test voltage only for rated voltages below 100 V — subject to manufacturer confirmation.
- ⑦ 6.14–6.16: insulation-resistance limits as printed in the new KOME book N/3 ("IR ≥ ... MΩ or ... Ω·F/CR, whichever is smaller"; Chinese and English agree). The earlier English/Chinese difference noted in the previous book no longer appears in N/3.
- ⑧ The Chinese text differs from the English in: section 1 (C0G "standard and medium/high-voltage" products; Class II "wide capacitance range, circuits with lower stability requirements"); the titles of 6.10 (solder resistance) and 6.11 (termination bond strength); 7.2.5 (2) (a leader of at least 5 pitches at the start of the tape); 7.2.5 (6) (peel torque). The English is printed — subject to manufacturer confirmation.
- ⑨ Tape drawings: in 7.2.2 the sprocket-hole pitch is 4.0±0.05 in the 8 mm drawing but 4.0±0.1 in the 12 mm drawing — subject to manufacturer confirmation.
- ⑩ Soldering: the wave-soldering caution gives a preheating–soldering temperature difference of ≤ 150 °C, ΔT ≤ 130 °C for hand soldering, and ΔT ≤ 150 °C (below 1206) / ≤ 130 °C (1206 and above) in the Pb-free reflow profile. The wave profile after 8.3.3 (260 °C max., 3~4 s) is not labelled lead-free — subject to manufacturer confirmation.
- ⑪ Drawings: in the breakaway drawing (8.1.2) the chip above the slit has no letter (a stray "C" is printed in the page margin) — subject to manufacturer confirmation.
- ⑫ Section numbering: section 3 has no number or heading on its page (title from the table of contents), the numbers 7.2.7.1 and 7.2.7.2 are printed with overlapping characters (they look like "7221" and "722"), and the curves page has no section number; the page numbers of the table of contents do not match the pages for sections 1–3 and are not reproduced — subject to manufacturer confirmation.